

Energizing EPA



ESPC, Green Power Make Ada EPA's First Carbon Neutral Laboratory

Blown Away by Green Power

On March 1, 2005, EPA's Atlantic Ecology Division laboratory in Narragansett, Rhode Island, began purchasing renewable energy certificates (RECs) equal to 100 percent of its annual electricity consumption. The three-year contract with 3 Phases Energy Services will help generate more than three million kilowatt hours of wind power annually from facilities in Palm Springs and Solano County, California, and Dodge Center, Minnesota. For more information on EPA's green power purchases, or to learn more about RECs, visit www.epa.gov/greening/epa/greenpower.htm or contact Justin Spenillo at (202) 564-0639 or spenillo.justin@epa.gov.

EPA's Robert S. Kerr Environmental Research Center in Ada, Oklahoma, now offsets all carbon dioxide (CO₂) emissions associated with its energy use. With the completion of an energy savings performance contract (ESPC) in June 2004, the laboratory has significantly reduced its annual energy and water consumption and eliminated its use of natural gas. In May 2005, EPA began purchasing green power for 100 percent of the Ada laboratory's electricity needs. As a result, the facility has become EPA's first "carbon neutral" laboratory, which means that none of its energy consumption is associated with the emission of greenhouse gases.

ESPCs help EPA save energy and water by using utility cost savings to pay for upgrades to heating, ventilation, and air conditioning (HVAC) and other systems. The Ada upgrade included the installation of a ground-source heat pump (GHP) system, which takes advantage of the constant, subsurface temperature of the Earth to cool the facility during hot summer months and heat it during cold winter months. This innovative system has eliminated the laboratory's need for natural gas, which was used for winter heating. It has also significantly reduced the amount of water used in its cooling towers for summer cooling.

Additional upgrades included the installation of a variable air volume (VAV) system for air supply and fume hood air exhaust; new and upgraded fan motors; and an integrated direct digital control system for HVAC, energy, fire, and security management. In the first two quarters of fiscal year (FY) 2005, the GHP and other efficiency measures have resulted



ESPC upgrades and green power purchases have virtually eliminated the greenhouse gas emissions associated with EPA's Ada facility.

in an energy use reduction of more than 50 percent and a water use reduction of more than 90 percent (when compared to the same time period averaged over the FY 1994 to FY 1996 baseline). These energy and water savings have already resulted in utility cost savings of more than \$115,000 over the six-month period.

To further reduce the facility's environmental footprint, EPA recently committed to purchase green power to offset the CO₂ emissions associated with the facility's remaining annual electricity consumption. On May 1, 2005, EPA entered into a contract to purchase three million kilowatt hours (kWh) worth of renewable energy certificates (RECs) annually from Sterling Planet, Inc. The three-year contract, procured by the Defense Energy Support Center, will help support the generation of wind power at facilities in Evanston, Wyoming; Rio Vista, California; and Ainsworth, Nebraska. Because the generation of wind power does not release any CO₂ emissions





Denver Breaks Ground and Sets Sights on Sustainability

One of EPA's "greenest" buildings to date is a step closer to reality. On June 2, 2005, EPA and the U.S. General Services Administration (GSA) broke ground for EPA's new Region 8 headquarters building in downtown Denver, Colorado. EPA will fully occupy the nine-story building, slated for completion in fall 2006.

At the groundbreaking ceremony, EPA Administrator Steve Johnson joined federal, regional, state, and local dignitaries, including Charles Bearrobe of the Oglala Lakota tribe, who gave a tribal blessing. In his remarks, EPA Region 8 Administrator Robert E. Roberts said, "Our job at EPA is to protect the environment. This building gives us the opportunity to put our money where our mouth is—to demonstrate that the concepts we work with daily are more than just abstract ideas."

EPA has been working with GSA to ensure that its new Region 8 headquarters building incorporates environmental provisions, meeting a minimum Silver certification by the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design



Administrator Steve Johnson spoke at the groundbreaking, which also included a tribal blessing by Charles Bearrobe.

(LEED™) program. The project team members anticipate the facility may exceed expectations and achieve Gold LEED certification. The building will be owned by Opus Northwest LLC and leased to EPA through GSA.

Region 8's new office building will showcase numerous environmental features, including:

- Highly-reflective ENERGY STAR®-rated roofing materials to reduce energy consumption and heat-island effects.
- Native vegetation in the roof-top garden to manage and filter rain water.
- A nine-story atrium that provides abundant natural lighting to reduce

energy consumption.

- Photovoltaic (solar) panels that generate electrical power to supplement green power purchases and reduce energy consumption.
- Low-flow plumbing fixtures and native, drought-tolerant landscaping to conserve water.
- Low volatile organic compound (VOC) interior adhesives, paints, sealants, and caulks to improve indoor air quality.
- Environmentally preferable janitorial and cleaning products to improve indoor air quality and reduce the use of toxic chemicals.
- An integrated pest management (IPM) plan to reduce the use of toxic chemicals.
- Recycling collection for newspapers, mixed office paper, cardboard, glass, plastics, metals, and toner cartridges to reduce the amount of waste disposed of in landfills.
- Extensive bike parking and shower facilities to encourage healthy, low-impact commuting.

For more information, contact Jim Blackledge at (303) 312-7224 or <blackledge.james@epa.gov>.

Drive Down Your Carbon

Easy Steps to Reduce CO₂

The car you drive and appliances you use every day are great conveniences. However, vehicle use and electricity generation contribute to global climate change by producing large amounts of carbon dioxide (CO₂), which is a potent greenhouse gas. Several innovative programs can help offset the CO₂ emissions you produce through your daily activities.

TerraPass

The concept behind this program is simple—estimate your car's CO₂

emissions using the online calculator, and then enroll in the program by purchasing a TerraPass. The cost of a TerraPass ranges from \$40 to \$80, based on your car's annual emissions. Your TerraPass is then used to fund environmental projects that reduce industrial CO₂ emissions, such as building wind farms and methane capture systems. Each TerraPass purchase is certified to eliminate the equivalent of your car's CO₂ pollution. See <www.terrapass.com> for more information.

NativeEnergy

Through participation in this program, you can offset CO₂ emissions by helping to finance renewable energy projects such as WindBuilders or Cool-Home, which are helping to build a

wind farm and a dairy farm methane project, respectively. Participants first determine their carbon footprint—the CO₂ emissions from major sources such as home energy consumption and transportation—using an online calculator. You can then help offset the impact of your own energy use by helping to finance these projects. See <www.nativeenergy.com> for more information.

Certified Clean Car Program

This program, sponsored by Renewable Ventures LLC, enables drivers to offset the CO₂ emissions from their cars by purchasing renewable energy credits (RECs), or carbon credits, equivalent to



The Oregon Trail Leads to Labs for the 21st Century

October 17-20, 2005, laboratory designers and engineers will gather in Portland, Oregon—a city with unparalleled environmental awareness and sustainable features—to take part in the Laboratories for the 21st Century (Labs21) 2005 Annual Conference. At this year's conference, attendees will discover new strategies for improving laboratory sustainability while taking advantage of new workshops, informative technical sessions, an offsite tour, evening receptions, and a technology fair highlighting new and innovative products.

Attendees can get a jump-start on the event by attending one of two pre-conference workshops on October 17. The Labs21 Introductory Course: High Performance, Low-Energy Design is a full-day workshop that introduces strategies for designing and constructing sustainable laboratories in new and existing facilities. The conference will also debut the Labs21 Advanced Course: Laboratory Ventilation Design, a full-day course that combines a series of modules on sustainable laboratory design with an emphasis on laboratory ventilation.

The conference will officially kick off with an opening reception on the evening of October 17, allowing attendees to network and peruse the technology fair, which will showcase innovative products that help make today's laboratories more sustainable.

This year's keynote speaker is Dr. Dan Arvizu, director of the National Renewable Energy Laboratory. Well known for his expertise in energy management, technology commercialization, and market-based solutions, Dr. Arvizu will offer his unique perspective on the intersection of business, sustainability, and science.

In addition to more than 50 technical presentations, this year's conference will include a *Roll Up Your Sleeves* Roundtable, helping laboratory designers craft solutions to specific design and engineering challenges facing current laboratory projects. Throughout the conference, the Labs21 Poster Session will also allow attendees to interact with the architects and engineers responsible for some of the world's most innovative laboratory designs. Participants can also travel offsite to the University of Portland, where they can tour Swindells

their vehicles' emissions. The money from the credits is invested in clean power generation that displaces the emissions of fossil fuel-burning power plants. According to Renewable Ventures, if one in 10 drivers in the United States joined the Certified Clean Car program, annual carbon emissions would be reduced by 150 million tons, the equivalent of powering 20 million homes with renewable energy sources. See <www.certifiedcleancar.com> for more information.

TravelCool!

Cars are not the only form of transportation that produce CO₂ emissions. The average U.S. domestic airline flight releases approximately 1,700 pounds of

CO₂ into the air. To tackle this problem, Better World Travel started the Travel-Cool! carbon offset program. Through this program, travelers can receive a carbon offset (\$11 value) by booking a flight through Better World Travel at <www.betterworldclub.com/travel/travel.htm>. Travelers also have the option of booking a flight by some other method, such as through an airline, and sending Better World Club a tax-deductible donation to offset the emissions from their flight (\$11 for domestic and \$22 for international flights). In addition, individuals can purchase auto insurance through Better World Insurance and have the first ton of their car's emissions offset for free. Individuals can also elect to simply make a direct donation, offset-

Events Not to Miss!

Greenbuild International Conference and Expo

November 9-11, 2005
Atlanta, Georgia
For more information and to register, visit <www.greenbuildexpo.org>.

Advanced Facilities Engineering Conference

November 10-11, 2005
Denver, Colorado
For more information, visit <www.afec.biz>.

National Facilities Management and Technology Conference/Exposition (NFM&T)

March 7-9, 2006
Baltimore, Maryland
For more information, visit <www.nfmt.com>.

Hall—a high performance facility that includes energy-efficient features such as intelligent fume hoods, an indirect evaporative cooling system, and a heat reclaiming system.

Don't miss the opportunity to participate in this exciting event! To register for the Labs21 2005 Annual Conference, visit <www.labs21century.gov>.

Did You Know?

- More than 300 million cars are on the road at any given time in the United States.
- According to EPA, the average car produces more than 13,000 pounds of CO₂ emissions each year.

ting approximately one ton of CO₂ emissions for every \$11 donated.

The funds are used to finance a variety of projects, such as tree planting and reforestation, building retrofits to improve heating and cooling efficiency, and developing wind power. See <www.betterworldclub.com/links/offsets.htm> for more information.



Water Savings Flood Corvallis Laboratory

In an effort to conserve water, protect ecosystems, and promote efficient water usage, EPA's National Health and Environmental Effects Research Laboratory, Western Ecology Division in Corvallis, Oregon, has implemented a comprehensive water management plan that is showing some promising results. The plan, which is part of the Agency's overall water conservation approach under Executive Order 13123, is also a key component of the facility's environmental management system (EMS).

Water use reduction measures at the Corvallis laboratory—including an upgraded air conditioning unit and the installation of water-reducing valves for its autoclaves—have significantly reduced the facility's water use. In the first three quarters of fiscal year 2005, the main laboratory saved nearly 3.5

million gallons of water compared to the average of the first three quarters of the previous two fiscal years. This 53 percent reduction in water consumption has resulted in initial cost savings of nearly \$17,000. A large portion of the water savings is due to the replacement of a computer room air conditioning unit in December 2004, which eliminated the need for single-pass cooling water. The single-pass cooling system required a continuous water flow, while the new unit is a closed loop system that uses recycled glycol for cooling instead.

The installation of water control valves on three autoclave units in July 2004 has already saved an estimated one million gallons of water. Autoclaves—devices that use steam to sterilize laboratory equipment—periodically discharge hot, condensed steam. This



By reusing two 2,500-gallon tanks, the Newport facility has a year-round source of fresh water.

hot water must be mixed with cooling water to prevent damage to the plumbing system. With the installation of water-reducing valves, cooling water is now only discharged when the autoclaves are operating, rather than on a continuous basis.

Additional water savings at the Corvallis laboratory are the result of public information and education programs such as the "Every Drop Counts" water conservation poster series, as well as prompt attention to repair any leaks or malfunctioning equipment. The facility has also made major strides in using water-efficient irrigation systems, planting native species, and incorporating irrigation system controls. Upgrading faucets and showerheads with water-conserving flow restrictors has also reduced the laboratory's water use.

"Through its water management plan and EMS, the Western Ecology Division laboratory has been successful in promoting more efficient water usage," said David Burr, the laboratory's health and safety/facilities manager. "We will continue to consider other projects to improve measurement and achieve additional water use reductions." For more information on the Corvallis facility's water savings, contact David Burr at (541) 754-4721 or <burr.dave@epa.gov>.

Rain Water Makes a Bath for Boats

The Pacific Coastal Ecology Branch (PCEB) of the Western Ecology Division (WED) laboratory in Newport, Oregon, has also created an innovative way to save water and reuse laboratory equipment. The laboratory reused old water holding tanks to create a rainwater capture system for washing down the branch's five small boats and two hovercraft after use. Taking advantage of coastal Oregon's extensive rainy season (with an average rainfall of 80 inches during the winter months combined), PCEB scientists designed the system to provide a source of fresh water that extends into the dry summer season.

After PCEB retrofitted its laboratories, the staff no longer used several large plastic holding tanks from the Pollution Abatement Facility. To make use of the equipment, two of the 2,500-gallon tanks were moved adjacent to the

PCEB building near the boat wash-down area. A roof gutter on the building was then diverted to fill the tanks, and a small pump was installed to pump the water to a spigot.

The in-house facilities support contractor provided the labor and parts, and the National Oceanic & Atmospheric Administration supplied the crane used to move the tanks while on site for another project, so the total cost of the project was extremely low. PCEB Branch Chief Walt Nelson praised this inventive use of recycled onsite materials, noting that the project has diverted materials from the waste stream while providing environmental and cost saving benefits to WED.

For more information on Newport's rainwater capture system, contact Walt Nelson at (541) 867-4041 or <nelson.walt@epa.gov>.



Cogeneration, Upgrades Fuel Region 9 Lab Energy Savings

EPA's Region 9 laboratory in Richmond, California, recently completed mechanical upgrades that will reduce the laboratory's energy consumption, cut its utility costs, and make the facility less vulnerable to the volatile California energy market.

Located in the northern San Francisco Bay Area, the Region 9 laboratory conducts chemical and biological analysis and field sampling services. This energy-intensive research, coupled with outdated mechanical and control systems, resulted in a high level of energy use. With eight years remaining on its building lease and rising energy costs in California, EPA had great incentive to improve the laboratory's energy performance. Working closely with the building owner, Wareham Properties, EPA developed an innovative project design and used utility rebates to help finance a series of upgrades.

Central to the facility's package of efficiency upgrades—completed in July 2005—was the installation of a natural gas cogeneration unit. Cogeneration, which is also referred to as “combined heat and power,” involves the generation of electricity and heat energy (as a byproduct) from a single energy input. With the installation of a 60-kilowatt-rated combustion engine that is integrated into the laboratory's water heating system, EPA uses natural gas to generate electricity on site for a portion of the laboratory's electricity needs. This process of converting natural gas into electricity not only reduces the building's electrical load on the local grid, but also produces a significant amount of heat. To make use of this otherwise wasted heat energy, a bundle of water-filled coils absorbs the engine's heat output and transports hot water to the water heating system, which heats the building.

Although the captured waste energy from the cogeneration unit often

provides most of the hot water needed for the laboratory's heating purposes, additional hot water is usually required to fully meet the building's year-round heating demands. To generate this remaining heat in a more efficient manner, EPA also replaced the building's existing single boiler with two smaller, energy-efficient, multiple-stage boilers, which can distribute required heat using considerably less energy during periods when heating demand is not at its peak.



The Richmond lab's cogeneration unit is expected to reduce the facility's electric demand by 17 to 23 percent.

To ensure that these newly installed, high-performance systems operate efficiently, EPA upgraded the digital control system as well. The upgrade features new digital controls for the cogeneration unit and boilers, as well as an updated user interface, allowing building engineers to better monitor the system's performance and make adjustments with greater ease from a single, computerized control terminal.

Although the boilers have been in operation since January 2005, EPA is still conducting comprehensive pilot testing on the cogeneration unit, which EPA hopes to make fully operational in September, pending approvals from the local utility, Pacific Gas & Electric (PG&E). While it is still too early to measure the

savings resulting from the upgrades, EPA has already cashed in with its local electricity provider. In March 2001, the California Public Utility Commission launched the Self-Generation Incentive Program (SGIP), which requires all public California electric utilities to provide financial incentives to customers installing onsite generation systems that provide all or a portion of their energy needs. With the installation of its cogeneration unit—which is expected to reduce the facility's electric demand by 17 to 23 percent—Wareham received a \$60,000 rebate from PG&E, which it then passed on to EPA.

Once the cogeneration unit, boilers, and control system are all fully operational, EPA expects this innovative upgrade package to translate into significant energy savings and reduced utility costs. In addition to the SGIP rebate, PG&E also provides the natural gas used in the combustion engine (which is metered separately) at a reduced rate, due to its use in an onsite generation system. Furthermore, because the heat output from the combustion engine is displacing natural gas that would otherwise be burned in the laboratory's boilers to generate hot water, the cogeneration unit is providing EPA with reduced-cost heat.

“The project's success is due in large part to EPA Region 9's dedication to reducing our laboratory's environmental footprint, EPA Headquarters' technical expertise in coordination with the Agency's Laboratories for the 21st Century program, and Wareham's support for the project,” said Brenda Bettencourt, director of the Region 9 laboratory.

For more information about the upgrades at EPA's Region 9 laboratory, visit <www.epa.gov/greeningepa/facilities/richmond-ca.htm> or contact Jennifer Mann at (510) 412-2314 or <mann.jennifer@epa.gov>.



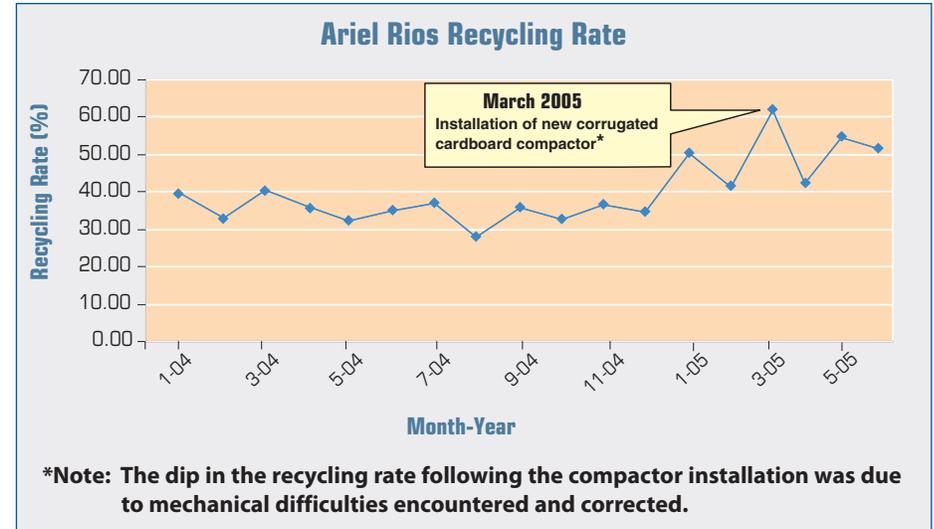
Compacting Corrugated Cardboard Helps Increase Headquarters' Recycling Rate

EPA Headquarters' recycling program received a boost from a new piece of equipment earlier this year. In March 2005, EPA Headquarters' Ariel Rios buildings in Washington, D.C., installed a new, 25-cubic-yard corrugated cardboard compactor that will forever change the way recycling occurs in the building.

Recycling at Ariel Rios increased by 38 percent—from 13 tons to 18 tons of recycled materials—in the compactor's first month of use alone, according to Mark Sajbel, regional recycling coordinator for the U.S. General Services Administration (GSA).

Before the compactor was installed, a janitorial contractor collected corrugated cardboard from the buildings and placed it in antiquated canvas carts. The use of carts to contain the corrugated cardboard limited the amount that was able to be recycled. These carts, according to Sajbel, were practically the same containers "used to collect scrap paper and rags at the turn of the century." The carts were then stored in the loading dock staging room, taking up most of the valuable space used for all the other recyclables.

In November 2004, GSA secured a delivery bay, as well as a loading bay



that once housed an empty, open-top container left from a construction job. GSA placed both a trash and a corrugated cardboard compactor in these bays, saving space, eliminating pests, and making trash and recyclables storage easier and more cost effective. The compactor increased Ariel Rios' capability of handling more corrugated cardboard, which makes up 25 percent of the building's waste stream.

Before the compactor was operational, GSA installed a ramp so that tilt trucks—large plastic containers on wheels that replaced the canvas carts—could be offloaded directly into the

compactor. By dumping the cardboard directly into the compactor, more recyclable materials can be stored. The compactor has the potential to process all of Ariel Rios' cardboard, giving EPA the capacity to recycle a total of more than 50 percent of its waste stream. In addition, because the compactor can store more materials in a smaller space, the recycling company doesn't have to make pick-ups as frequently, saving labor and gas.

By increasing the buildings' recycling rate, the new equipment has proven to be an integral part of updating Ariel Rios' recycling program.

Carbon Neutral

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into the atmosphere, the 100 percent green power purchase effectively offsets all CO₂ emissions associated with the building's annual electricity use.

"EPA's Facilities Management and Services Division (FMSD) would like to commend the staff at the Ada laboratory for their dedication to the execution of these projects," said FMSD Director David Lloyd.

"Their hard work and patience has helped transform the laboratory's infrastructure into a state-of-the-art system that can serve as a new standard for energy and water efficiency."

For more information about EPA's Robert S. Kerr Environmental Research Center, visit <www.epa.gov/greeningepa/facilities/ada.htm>.

Contact Us

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